

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device,
comprising:

forming a film on a semiconductor substrate;

performing a dry etching process for removing said film
5 while monitoring a plasma emission at a plurality of
wavelengths;

wherein said performing said dry etching process
includes determining an endpoint of said dry etching process
based on a change of intensity of the plasma emission at said
10 plurality of wavelengths.

2. The method as set forth in Claim 1,
wherein said film contains nitrogen.

3. The method as set forth in Claim 1,
wherein said film contains one of SiCN and SiON.

4. The method as set forth in Claim 1,
wherein said film is a insulating film provided on another
film containing nitrogen in direct contact therewith.

5. The method as set forth in Claim 1,
wherein said film is a insulating film provided on another
film containing one of SiCN and SiON in direct contact
therewith.

6. The method as set forth in Claim 4,
wherein said insulating film does not contain nitrogen.

7. The method as set forth in Claim 5,
wherein said insulating film does not contain nitrogen.

8. The method as set forth in Claim 1,
wherein said plurality of different wavelengths is an
emission band having a luminous intensity peak in the
proximity of 358 nm and in an emission band having a luminous
5 intensity peak in the proximity of 387 nm.

9. A method of manufacturing a semiconductor device including
a nitrogen-containing film formed on a semiconductor
substrate and a film formed on said nitrogen-containing film
in direct contact therewith, comprising:

5 performing a dry etching process for removing said film
at least until reaching an interface with said nitrogen-
containing film while monitoring plasma emission at a
plurality of wavelength;

wherein said performing said dry etching process
10 includes determining an endpoint based on a change of
intensity of the plasma emission at said plurality of
wavelengths.

10. A method of manufacturing a semiconductor device
including a film formed on a semiconductor substrate and a
nitrogen-containing film formed on said film in direct
contact therewith, comprising:

5 performing a dry etching process for removing said
nitrogen-containing film at least until reaching an interface
with said film while monitoring plasma emission at a
plurality of wavelength;

wherein said performing said dry etching process
10 includes determining an endpoint based on a change of

intensity of the plasma emission at said plurality of wavelengths.

11. The method as set forth in Claim 9, wherein said film does not contain nitrogen.

12. The method as set forth in Claim 10, wherein said film does not contain nitrogen.

13. An apparatus of manufacturing a semiconductor device comprising:

a detecting unit which detects a variation of intensity of plasma emission at each of a plurality of wavelengths
5 during a dry etching process of one of a nitrogen-containing film provided on a semiconductor substrate and a non-nitrogen film provided in direct contact with said nitrogen-containing film;

an arithmetic processing unit which executes arithmetic
10 processing based on the detected variation; and

a control unit which determines an endpoint of said dry etching process in consideration of said arithmetic processing result.

14. The apparatus as set forth in Claim 13, wherein said detecting unit detects an emission band having a luminous intensity peak in the proximity of 358 nm and an emission band having a luminous intensity peak in the
5 proximity of 387 nm.

15. A method of manufacturing a semiconductor device, comprising the steps of:

forming a film on a substrate;

starting a dry etching of the film in a dry etching
5 system;

monitoring a plasma emission from the dry etching
system;

detecting an endpoint of the dry etching based on
intensity of the monitored plasma emission at predetermined
10 wavelengths; and

ending the dry etching of the film,

wherein intensity of at least two wavelengths is
monitored at said monitoring the plasma emission.

16. An apparatus of manufacturing a semiconductor device
comprising:

a dry etching unit for etching a film formed on a
substrate;

5 a monitoring unit for monitoring a plasma emission from
the dry etching unit; and

a detecting unit for detecting endpoint of the dry
etching based on intensity of the monitored plasma emission
at predetermined wavelengths,

10 wherein said monitoring unit monitors intensity of at
least two wavelengths.